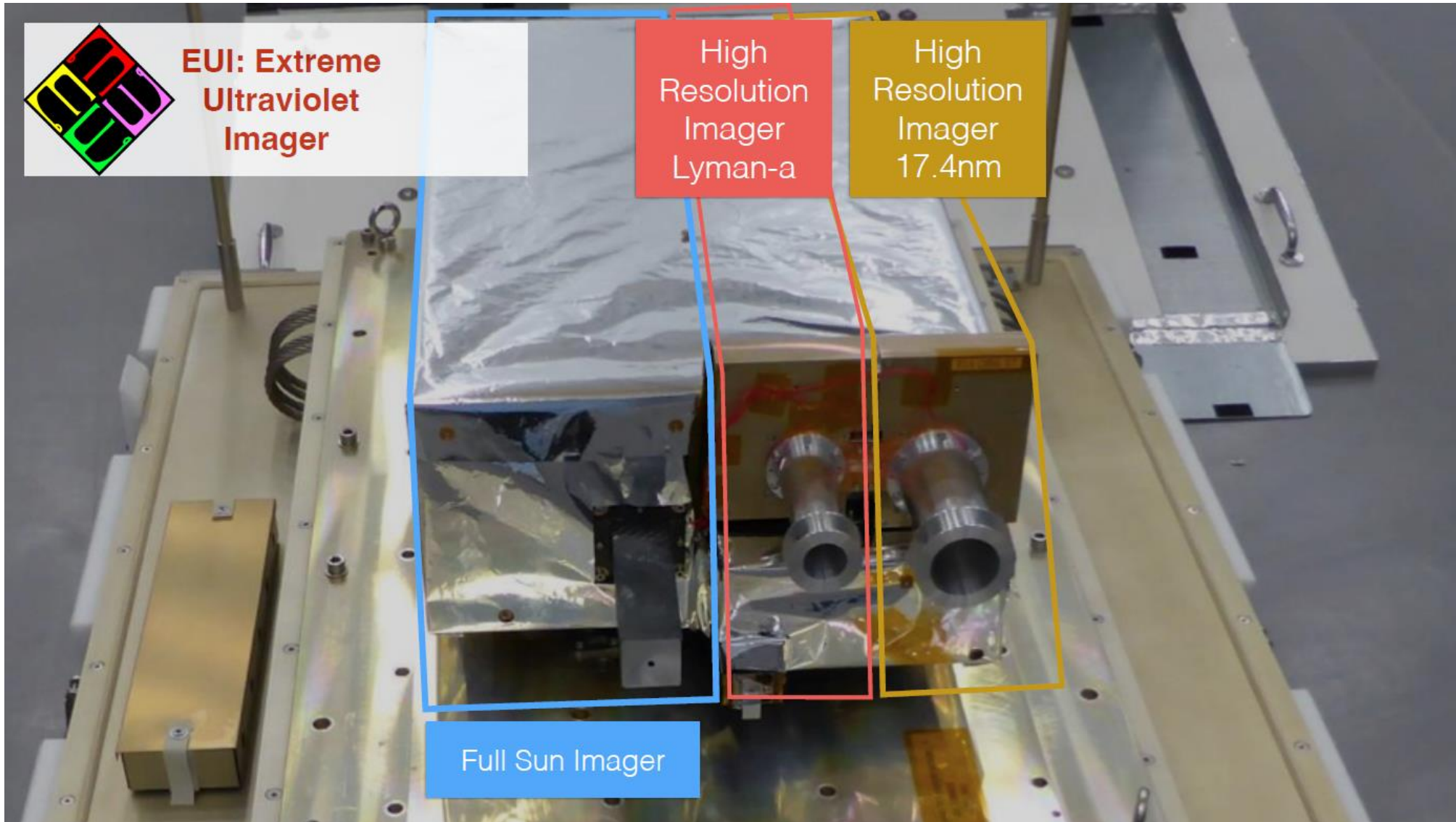
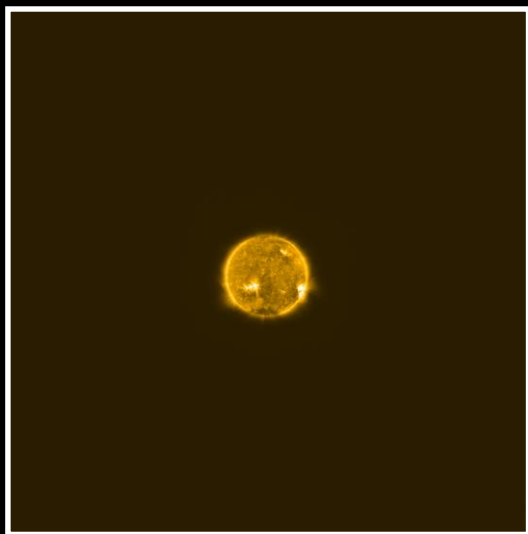


Using EUI to link EPD events back to the Sun

Luciano Rodriguez¹ and the EUI team



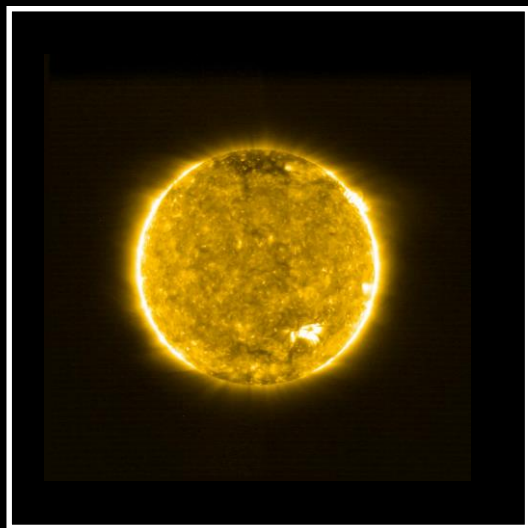


3072x3072 CMOS - 15 bit

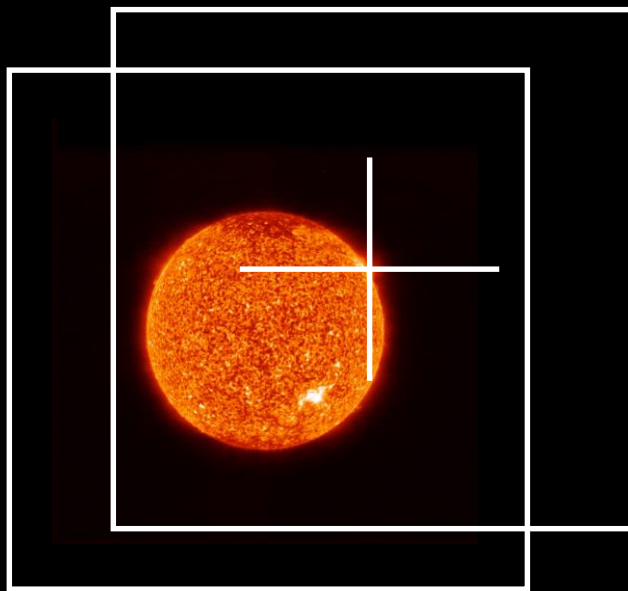
2-pix resolution: 9 arcsec
FOV: 3.8°x3.8°

@ 1 AU: (14 R_{sun})²
@ 0.28 AU: (4 R_{sun})²

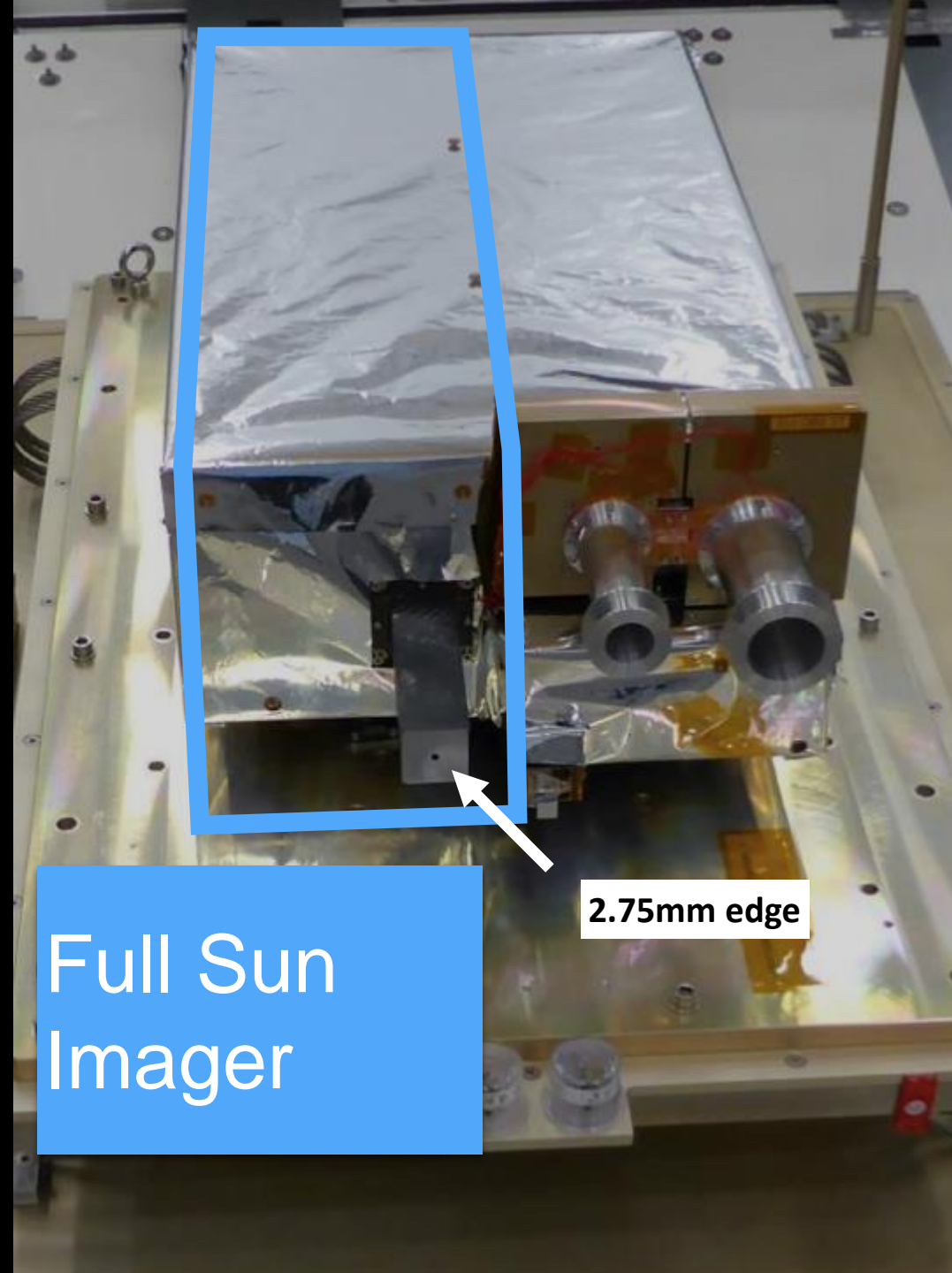
cadence: ~ minutes



17.4nm

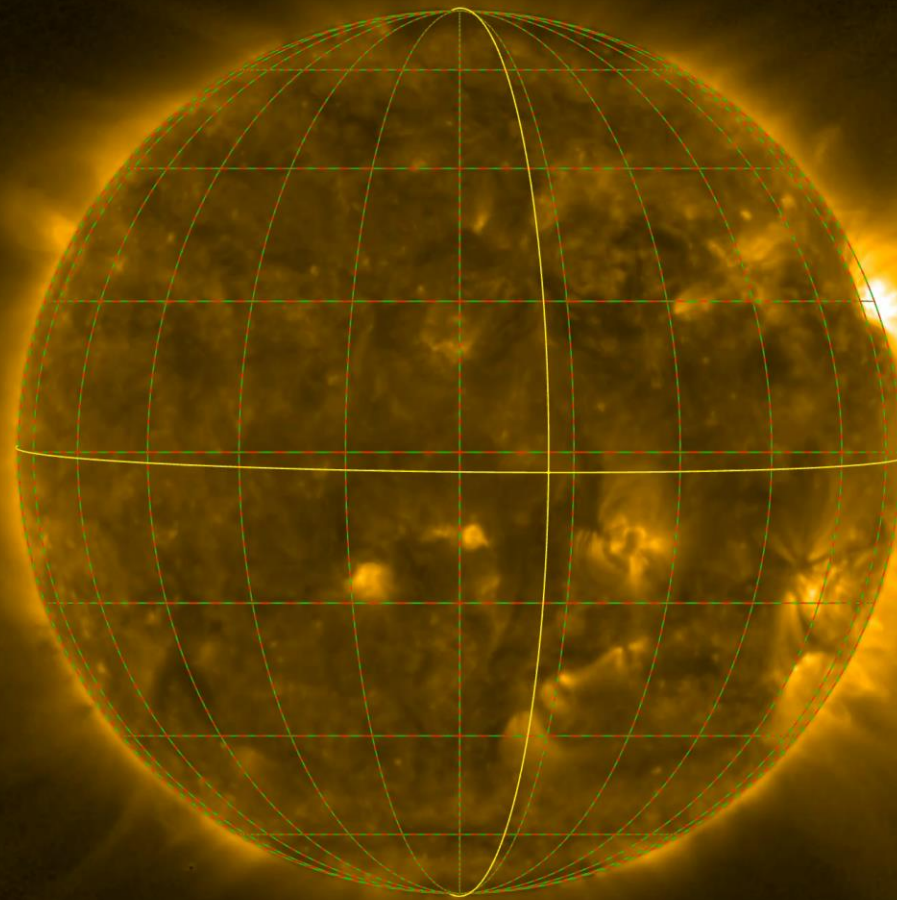


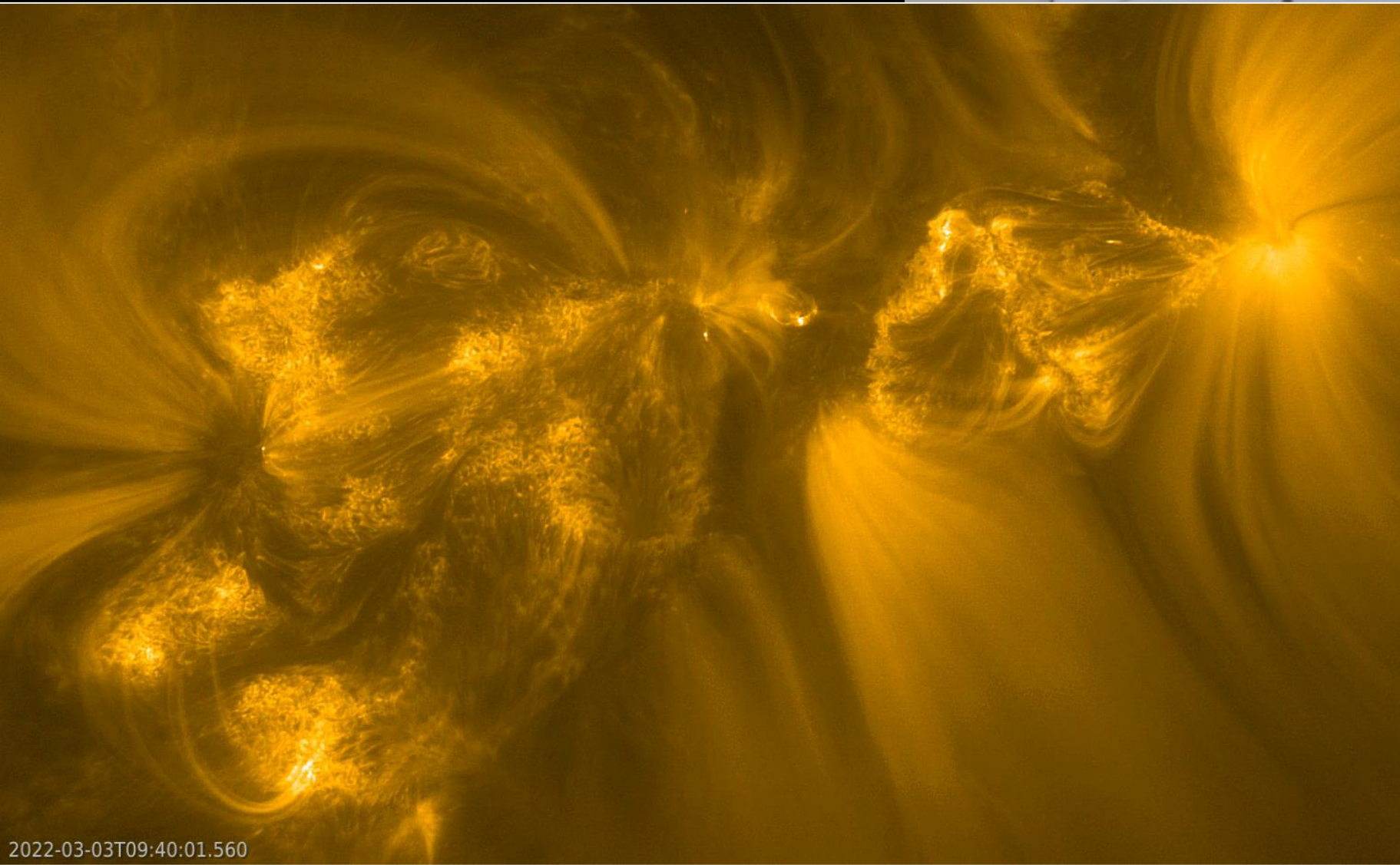
30.4nm



Full Sun Imager

2.75mm edge





FOV:
 $17 \text{ arcmin}^2 \rightarrow (2048)^2$
@ 0.28 AU: $(0.3 R_{\text{sun}})^2$

Resolution:
2 pixels = 1 arcsec
@ 0.28 AU: 200 km

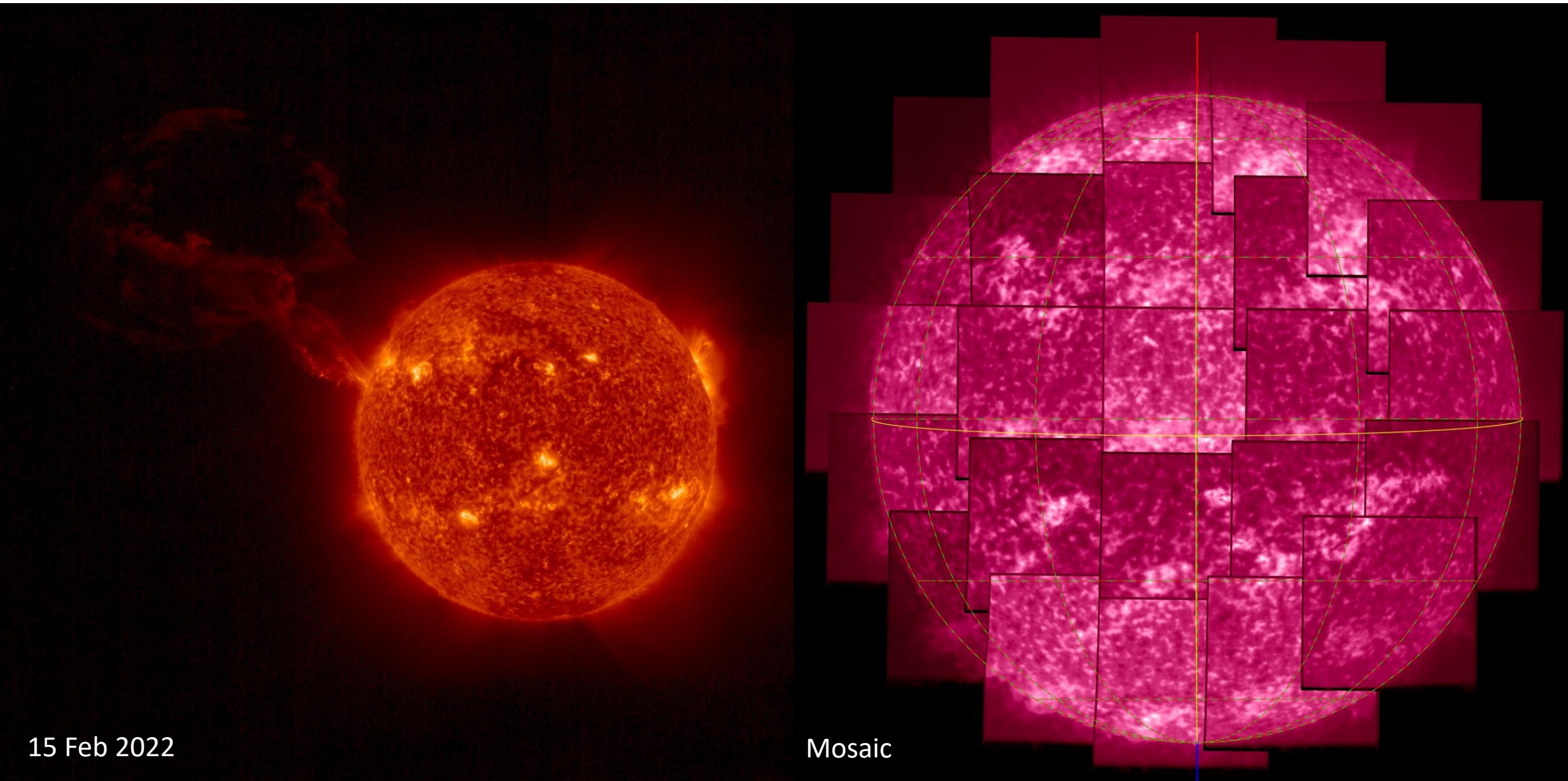
Cadence ~ seconds



High Resolution Imager EUV

2022-03-03T09:40:01.560

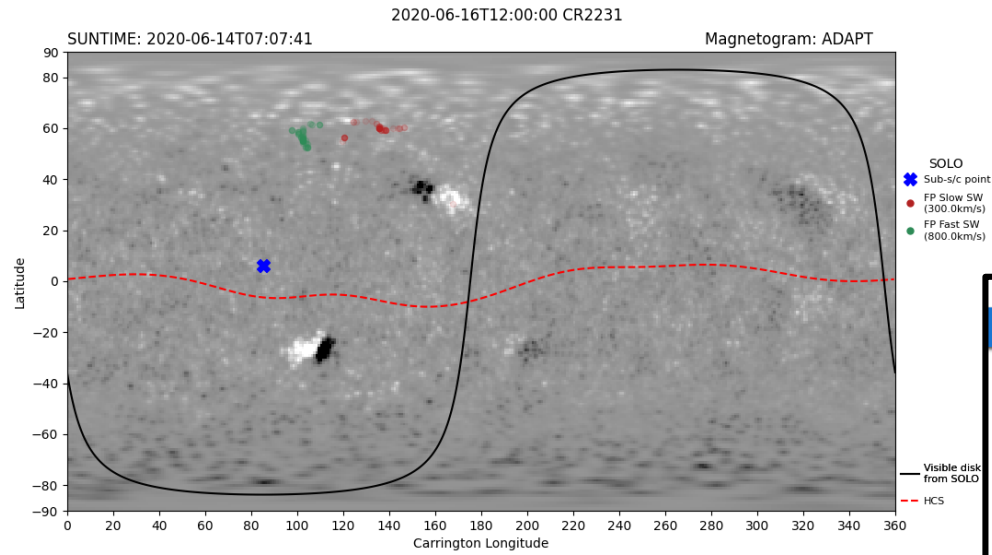
FSI 30.4 & HRI-Lya



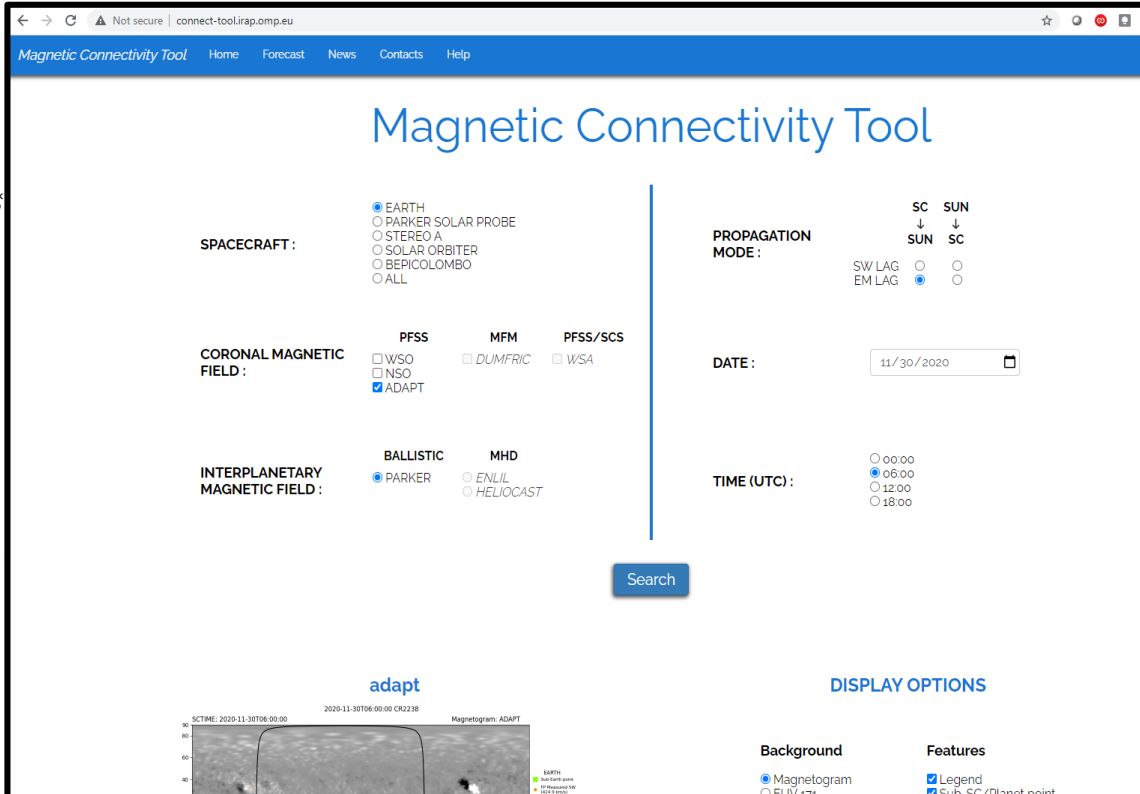
15 Feb 2022

Mosaic

SoLO MADA WG: Magnetic connection



<http://connect-tool.irap.omp.eu/>



Magnetic Connectivity Tool

Home Forecast News Contacts Help

Magnetic Connectivity Tool

SPACECRAFT:

- EARTH
- PARKER SOLAR PROBE
- STEREO A
- SOLAR ORBITER
- BEPICOLOMBO
- ALL

CORONAL MAGNETIC FIELD:

PFSS MFM PFSS/SCS

- WSO
- DUMFRIC
- WSA
- NSO
- ADAPT

INTERPLANETARY MAGNETIC FIELD:

BALLISTIC MHD

- PARKER
- ENLIL
- HELIOCAST

PROPAGATION MODE:

SC SUN

↓ ↓

SUN SC

SW LAG

EM LAG

DATE:

TIME (UTC):

00:00

06:00

12:00

18:00

SEARCH

DISPLAY OPTIONS

Background

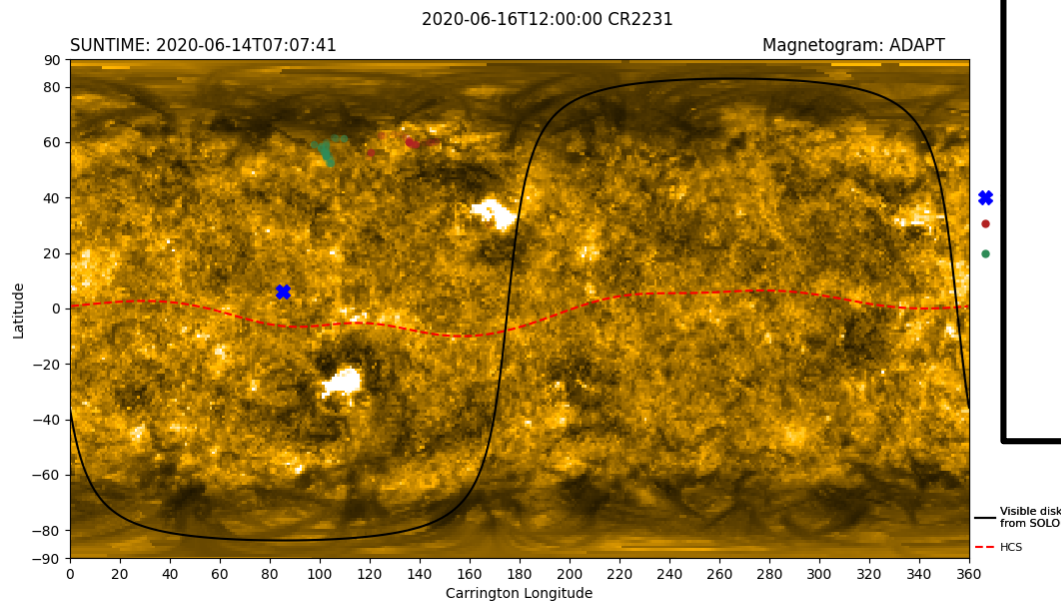
- Magnetogram
- EUV 171

Features

- Legend
- Sub-SC/Planet point

adap

SCTIME: 2020-11-30T06:00:00 2020-11-30T06:00:00 CR2238 Magnetogram: ADAPT



Connectivity data in JHV

The screenshot displays the ESA JHelioviewer interface. The main window shows a solar image with a red line representing a connectivity path. A blue arrow labeled 'HCS' points to the path, and two green arrows labeled 'Footpoints' point to the path's ends. The left sidebar contains a list of layers, with 'Connection' and 'Timestamp' checked and circled in red. The bottom status bar shows the timestamp '2022-03-16T14:10:50.424' and technical parameters.

Image Layers

- 2022-03-16T10:33:09
- 2022-03-16T18:55:09
- New Layer
- EUI FSI 174 2022-03-16T14:10:50.424
- EUI FSI 174 2020-11-17T22:57:21.271
- Viewpoint 2022-03-16T14:10:50.424
- Grid
- FOV
- Connection
- Timestamp
- Miniview
- Clear all Connectivity HCS Footpoint

Timeline Layers

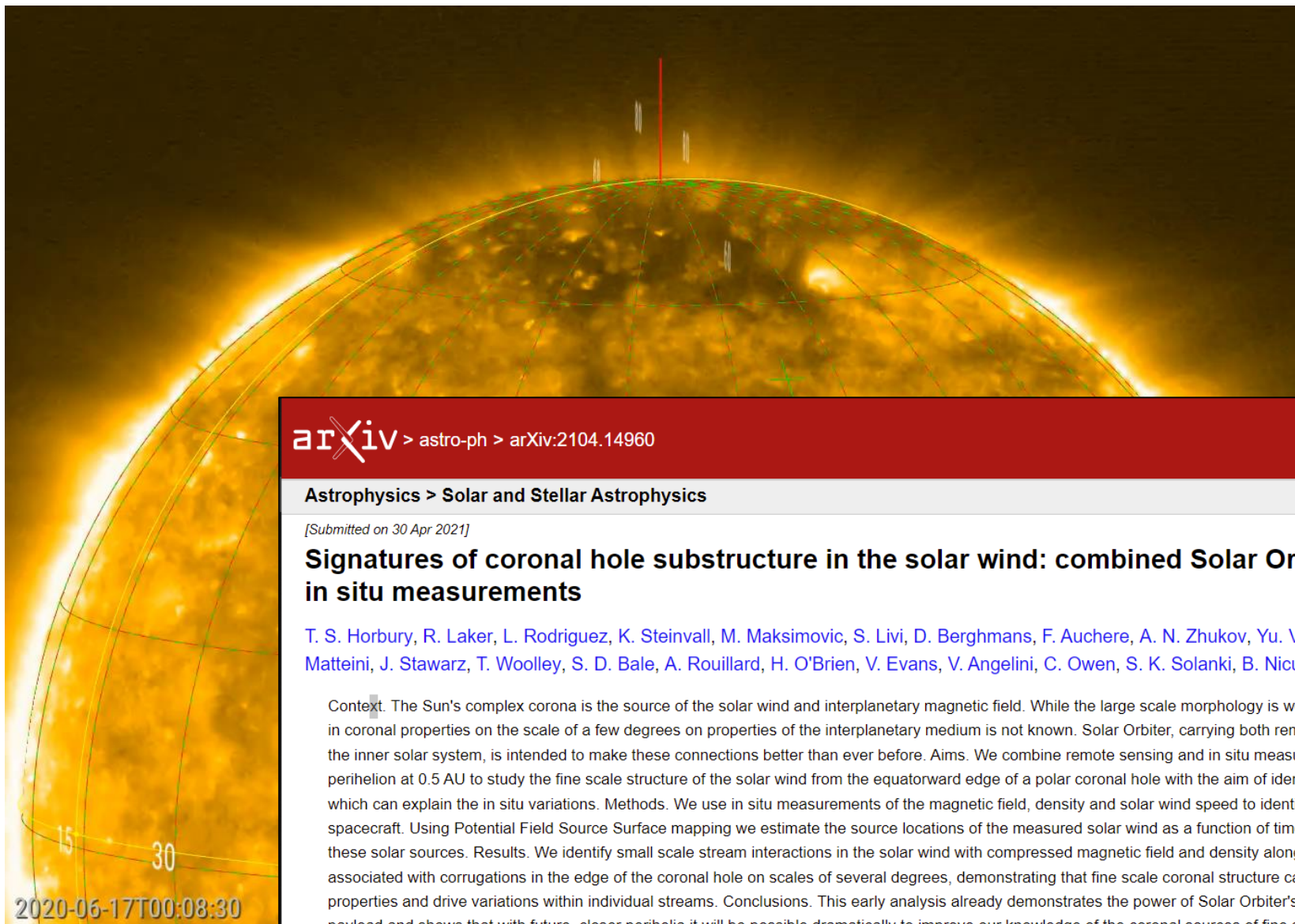
- New Layer
- Callisto Radiogram
- SWEK Events

Space Weather Event Knowledgebase

- Flare
- Coronal Mass Ejection
- Active Region
- Coronal Hole
- Sunspot
- Coronal Dimming
- Coronal Wave
- Filament
- Filament Eruption

2022-03-16T14:10:50.424

FPS: 0 | CR: 2255.33 | FOV: 3.47R☉ | D☉: 0.384au | (ρ,ψ):(1.78R☉,+341.83°) | (φ,θ):(--°, --°) | (x,y):(+1385", +1.17") | 1872, 629



arXiv > astro-ph > arXiv:2104.14960

Search...

Help | Advanced

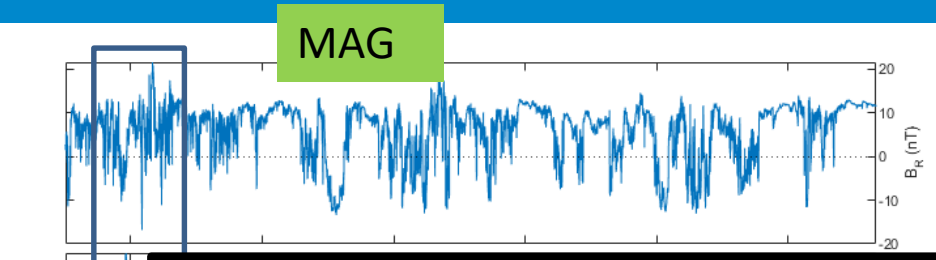
Astrophysics > Solar and Stellar Astrophysics

[Submitted on 30 Apr 2021]

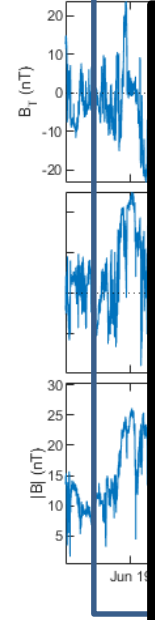
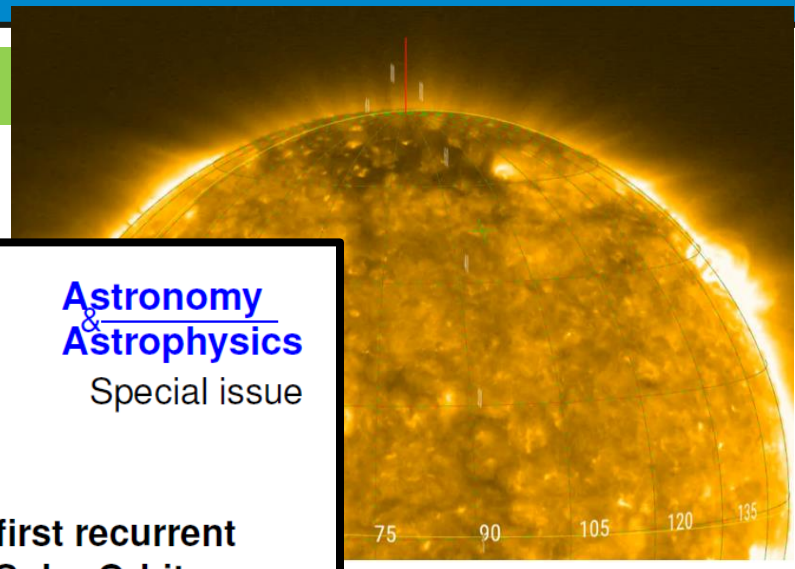
Signatures of coronal hole substructure in the solar wind: combined Solar Orbiter remote sensing and in situ measurements

T. S. Horbury, R. Laker, L. Rodriguez, K. Steinvall, M. Maksimovic, S. Livi, D. Berghmans, F. Auchere, A. N. Zhukov, Yu. V. Khotyaintsev, L. Woodham, L. Matteini, J. Stawarz, T. Woolley, S. D. Bale, A. Rouillard, H. O'Brien, V. Evans, V. Angelini, C. Owen, S. K. Solanki, B. Nicula, D. Muller, I. Zouganelis

Context. The Sun's complex corona is the source of the solar wind and interplanetary magnetic field. While the large scale morphology is well understood, the impact of variations in coronal properties on the scale of a few degrees on properties of the interplanetary medium is not known. Solar Orbiter, carrying both remote sensing and in situ instruments into the inner solar system, is intended to make these connections better than ever before. **Aims.** We combine remote sensing and in situ measurements from Solar Orbiter's first perihelion at 0.5 AU to study the fine scale structure of the solar wind from the equatorward edge of a polar coronal hole with the aim of identifying characteristics of the corona which can explain the in situ variations. **Methods.** We use in situ measurements of the magnetic field, density and solar wind speed to identify structures on scales of hours at the spacecraft. Using Potential Field Source Surface mapping we estimate the source locations of the measured solar wind as a function of time and use EUI images to characterise these solar sources. **Results.** We identify small scale stream interactions in the solar wind with compressed magnetic field and density along with speed variations which are associated with corrugations in the edge of the coronal hole on scales of several degrees, demonstrating that fine scale coronal structure can directly influence solar wind properties and drive variations within individual streams. **Conclusions.** This early analysis already demonstrates the power of Solar Orbiter's combined remote sensing and in situ payload and shows that with future, closer perihelia it will be possible dramatically to improve our knowledge of the coronal sources of fine scale solar wind structure, which is important both for understanding the phenomena driving the solar wind and predicting its impacts at the Earth and elsewhere.



EUI



A&A 656, L10 (2021)
<https://doi.org/10.1051/0004-6361/202140966>
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Astronomy & Astrophysics
 Special issue

Solar Orbiter First Results (Cruise Phase)

LETTER TO THE EDITOR

Evidence for local particle acceleration in the first recurrent galactic cosmic ray depression observed by Solar Orbiter

The ion event on 19 June 2020*

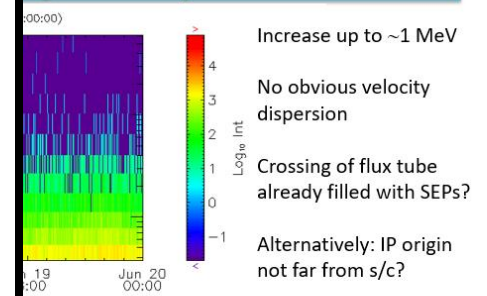
A. Aran¹, D. Pacheco², M. Laurenza³, N. Wijsen⁴, D. Lario⁵, S. Benella³, I. G. Richardson^{5,6}, E. Samara^{4,7}, J. L. Freiherr von Forstner^{2,8}, B. Sanahuja¹, L. Rodriguez⁷, L. Balmaceda^{5,9}, F. Espinosa Lara¹⁰, R. Gómez-Herrero¹⁰, K. Steinvall^{11,12}, A. Vecchio^{13,14}, V. Krupar^{15,5}, S. Poedts^{4,16}, R. C. Allen¹⁷, G. B. Andrews¹⁷, V. Angelini¹⁸, L. Berger², D. Berghmans⁷, S. Boden^{2,19}, S. I. Böttcher², F. Carcaboso¹⁰, I. Cernuda¹⁰, R. De Marco³, S. Eldrum², V. Evans¹⁸, A. Fedorov²⁰, J. Hayes¹⁷, G. C. Ho¹⁷, T. S. Horbury¹⁸, N. P. Janitzek²¹, Yu. V. Khotyaintsev¹¹, A. Kollhoff², P. Köhl², S. R. Kulkarni^{2,22}, W. J. Lees¹⁷, P. Louarn²⁰, J. Magdalenic^{4,7}, M. Maksimovic¹³, O. Malandraki²³, A. Martínez¹⁰, G. M. Mason¹⁷, C. Martín^{2,24}, H. O'Brien¹⁸, C. Owen²⁵, P. Parra¹⁰, M. Prieto Mateo¹⁰, A. Ravanbakhsh^{2,26}, J. Rodríguez-Pacheco¹⁰, O. Rodríguez Polo¹⁰, S. Sánchez Prieto¹⁰, C. E. Schlemm¹⁷, H. Seifert¹⁷, J. C. Terasa², K. Tyagi^{17,27}, C. Verbeek⁷, R. F. Wimmer-Schweingruber², Z. G. Xu², M. K. Yedla^{2,26}, and A. N. Zhukov^{7,28}

(Affiliations can be found after the references)

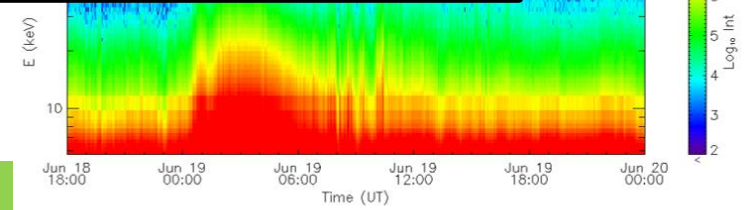
Received 31 March 2021 / Accepted 1 August 2021

- Faint
- Probab

dynamic spectrum



EPD



https://wwwbis.sidc.be/EUI/data/latest_release_notes.html

 Royal Observatory of Belgium

Solo/EUI Data Release 4.0 2021-12

DOI:	https://doi.org/10.24414/s5da-7e78
Title:	Solo/EUI Data Release 4.0 2021-12
Published:	2021
Publisher:	Royal Observatory of Belgium (ROB)
Data Availability:	http://sidc.be/EUI/data/releases/202112_release_4.0

Creators: Auchere Frederic, Mampaey Benjamin, Verbeeck Francis, Stegen Koen, Kraaikamp Emil, Gissot Samuel, Berghmans David (Principal Investigator)

Contributors: Rochus Pierre, Harra Louise, Schuehle Udo, Long David, Aznar Cuadrado Regina, Buchlin Eric, Halain Jean-Philippe, Jacques Lionel, Mierla Marilena, Nicula Bogdan, Parenti Susanna, Rodriguez Luciano, Smith Phil, Teriaca Luca, Zhukov Andrei.

Description: The Extreme Ultraviolet Imager (EUI) is part of the remote sensing instrument package of the ESA/NASA Solar Orbiter mission. The EUI consists of three telescopes, the Full Sun Imager (FSI) and two High Resolution Imagers (HRILYA, HRIEUV), which are optimised to image in Lyman- α and EUV (17.4 nm, 30.4 nm). The 3 telescopes together provide a coverage from chromosphere up to corona with both high resolution and with a wide field of view. EUI scientific data consists of calibrated and raw data images acquired by the three EUI telescopes. Following the orbit profile of Solar Orbiter, the data coverage, imaging cadence and effective spatial resolution of the EUI data are very variable. "EUI data release 4.0 2021-12" contains the Solar Orbiter/EUI data from the Near Earth Commissioning Phase (NECP) and Cruise Phase. This implies that most data is the result of technical tests, for which the instrument configuration was often non-nominal. Most data is therefore a-priori not suitable for scientific analysis but is instead primarily intended as a reference for the further development of analysis and visualisation software.
[Technical release notes](#)

Dates: Time range of observations: 2020-03-03/2021-09-15
Date of latest image file production: 2021-11-27
Date of DOI mining: 2021-12-15

Contact me directly for more recent data

Getting EUI data

<http://soar.esac.esa.int/>

Not secure | soar.esac.esa.int/soar/#results

EUROPEAN SPACE AGENCY SCIENCE & TECHNOLOGY SIGN IN

Solar Orbiter Archive

SOAR 1.3.1

RESULTS #1 x

science (3472)

Item Id	Level	Descriptor	Begin Time	End Time	Instrument	File Format	File Size	Archived On
solo_L2_eui-fsi304-image_20200512T085922556	L2	EUI-FSI304-IMAGE	2020-05-12 08:59:22.556	2020-05-13 08:59:22.556	EUI	FITS	36 MB	2020-12-04 08:51:35.455
solo_L2_eui-fsi304-image_20200512T085937557	L2	EUI-FSI304-IMAGE	2020-05-12 08:59:37.557	2020-05-13 08:59:37.557	EUI	FITS	36 MB	2020-12-04 08:51:37.261
solo_L2_eui-fsi304-image_20200512T090003681	L2	EUI-FSI304-IMAGE	2020-05-12 09:00:03.681	2020-05-13 09:00:03.681	EUI	FITS	36 MB	2020-12-04 08:53:23.25
solo_L2_eui-fsi304-image_20200512T090013681	L2	EUI-FSI304-IMAGE	2020-05-12 09:00:13.681	2020-05-13 09:00:13.681	EUI	FITS	36 MB	2020-12-04 08:53:24.212
solo_L2_eui-fsi174-image_20200512T102124190	L2	EUI-FSI174-IMAGE	2020-05-12 10:21:24.19	2020-05-13 10:21:24.19	EUI	FITS	36 MB	2020-12-04 08:35:19.552
solo_L2_eui-fsi174-image_20200512T102139189	L2	EUI-FSI174-IMAGE	2020-05-12 10:21:39.189	2020-05-13 10:21:39.189	EUI	FITS	36 MB	2020-12-04 08:35:22.273
solo_L2_eui-fsi174-image_20200512T102246441	L2	EUI-FSI174-IMAGE	2020-05-12 10:22:46.441	2020-05-13 10:22:46.441	EUI	FITS	36 MB	2020-12-04 08:35:23.407
solo_L2_eui-fsi174-image_20200512T102446440	L2	EUI-FSI174-IMAGE	2020-05-12 10:24:46.44	2020-05-13 10:24:46.44	EUI	FITS	36 MB	2020-12-04 08:35:24.079
solo_L2_eui-fsi174-image_20200512T102646440	L2	EUI-FSI174-IMAGE	2020-05-12 10:26:46.44	2020-05-13 10:26:46.44	EUI	FITS	36 MB	2020-12-04 08:35:25.194
solo_L2_eui-fsi174-image_20200512T103656566	L2	EUI-FSI174-IMAGE	2020-05-12 10:36:56.566	2020-05-13 10:36:56.566	EUI	FITS	36 MB	2020-12-04 08:35:26.214

1 of 35 Page size: 100

Displaying 1-100 of 3472

HRI pointing: MADA WG Pointing Decision Meetings

VSTP Meetings to decide the last minute (~3 days in advance) pointing of HRIs and others

VSTP_UPDATE UTC	which carried the pVSTP start decision for:	SOOP coordinators (supported by)	SOC guess of MADAWG involvement	T1 pass start before VSTP UTC	PTR to MOC deadline UTC	Pointing decision meeting proposal UTC	Pointing decision meeting proposal EUROPEAN	T4 Write LL before this UTC
<i>MADAWG checkpoint meeting - review the state of the Sun and the readiness for the upcoming decision meetings</i>							25/02/2022 09:30	24/02/2022 09:50
01/03/2022 10:00	Connection mosaic 1	Alessandra Giunta, Natalia Prado, Don Hassler	YES	28/02/2022 23:50	26/02/2022 23:50	26/02/2022 15:00	26/02/2022 16:00	26/02/2022 09:33
02/03/2022 06:00	Slow wind connection	Stephanie Yardley	YES	02/03/2022 00:44	28/02/2022 00:44	27/02/2022 15:00	27/02/2022 16:00	27/02/2022 09:24
03/03/2022 18:00	update slow wind connection	Stephanie Yardley	YES	03/03/2022 12:49	01/03/2022 12:49	01/03/2022 09:00	01/03/2022 10:00	28/02/2022 23:50
05/03/2022 17:40	update slow wind connection	Stephanie Yardley	YES	05/03/2022 08:31	03/03/2022 08:31	02/03/2022 15:00	02/03/2022 16:00	02/03/2022 00:44
06/03/2022 16:40	Point pole and nanoflares (active region)	A. Zhukov - Pole	NO for pole	06/03/2022 07:26	04/03/2022 07:26	03/03/2022 15:00	03/03/2022 16:00	03/03/2022 12:49
16/03/2022 20:30	Nanoflares (quiet and active) and slow wind connection	S. Parenti (D. Berghmans) - Nanof	YES for nanoflares	16/03/2022 07:13	14/03/2022 07:13	13/03/2022 15:00	13/03/2022 16:00	13/03/2022 11:02
17/03/2022 13:30	update slow wind connection	S. Parenti (D. Berghmans) - Nanof	YES for both	16/03/2022 07:13	14/03/2022 07:13	13/03/2022 15:00	13/03/2022 16:00	13/03/2022 11:02
17/03/2022 13:30	update slow wind connection	Stephanie Yardley - SW	YES	17/03/2022 07:08	15/03/2022 07:08	14/03/2022 15:00	14/03/2022 16:00	14/03/2022 07:24
18/03/2022 16:20	update slow wind connection	Stephanie Yardley	YES	18/03/2022 07:04	16/03/2022 07:04	15/03/2022 15:00	15/03/2022 16:00	15/03/2022 09:30
19/03/2022 16:20	update slow wind connection	Stephanie Yardley	YES	19/03/2022 07:01	17/03/2022 07:01	16/03/2022 15:00	16/03/2022 16:00	16/03/2022 07:13
20/03/2022 16:20	update slow wind connection	Stephanie Yardley	YES	20/03/2022 09:20	18/03/2022 09:20	17/03/2022 15:00	17/03/2022 16:00	17/03/2022 07:08
29/03/2022 16:20	Nanoflares (active region), point pole, connection mosaic 2	S. Parenti (D. Berghmans) - Nanof	YES for nanoflares	29/03/2022 06:59	27/03/2022 06:59	26/03/2022 15:00	26/03/2022 16:00	26/03/2022 10:40
		A. Zhukov - Pole	NO for pole					
		Alessandra Giunta, Natalia Prado, Don Hassler - mosaic	YES for mosaic					
31/03/2022 13:10	Long term active region	Luis Bellot (D. Berghmans, M. Janvier)	probably Yes	31/03/2022 06:13	29/03/2022 06:13	28/03/2022 14:00	28/03/2022 16:00	28/03/2022 06:57
01/04/2022 16:30	update long term active region	Luis Bellot (D. Berghmans, M. Janvier)	probably Yes	01/04/2022 07:07	30/03/2022 07:07	29/03/2022 14:00	29/03/2022 16:00	29/03/2022 06:59
02/04/2022 16:40	update long term active region	Luis Bellot (D. Berghmans, M. Janvier)	probably Yes	02/04/2022 07:10	31/03/2022 07:10	30/03/2022 14:00	30/03/2022 16:00	30/03/2022 07:01
03/04/2022 16:40	update long term active region, point pole	Luis Bellot (D. Berghmans, M. Janvier)	probably Yes for LTAR	03/04/2022 07:13	01/04/2022 07:13	31/03/2022 14:00	31/03/2022 16:00	31/03/2022 06:13
		A. Zhukov - Pole	NO for pole					

Not huge margin wrt MOC deadline

Tightish wrt the decision meeting

Weekend PDM

Summertime started

All PD meetings occur on this Webex:
Meeting link:
<https://esait.webex.com/esait/j.php?MTID=m57a250bb68040134e06aa1962c3298ee>
Meeting number: 2366 381 7297
Password: ryNQRnUu426

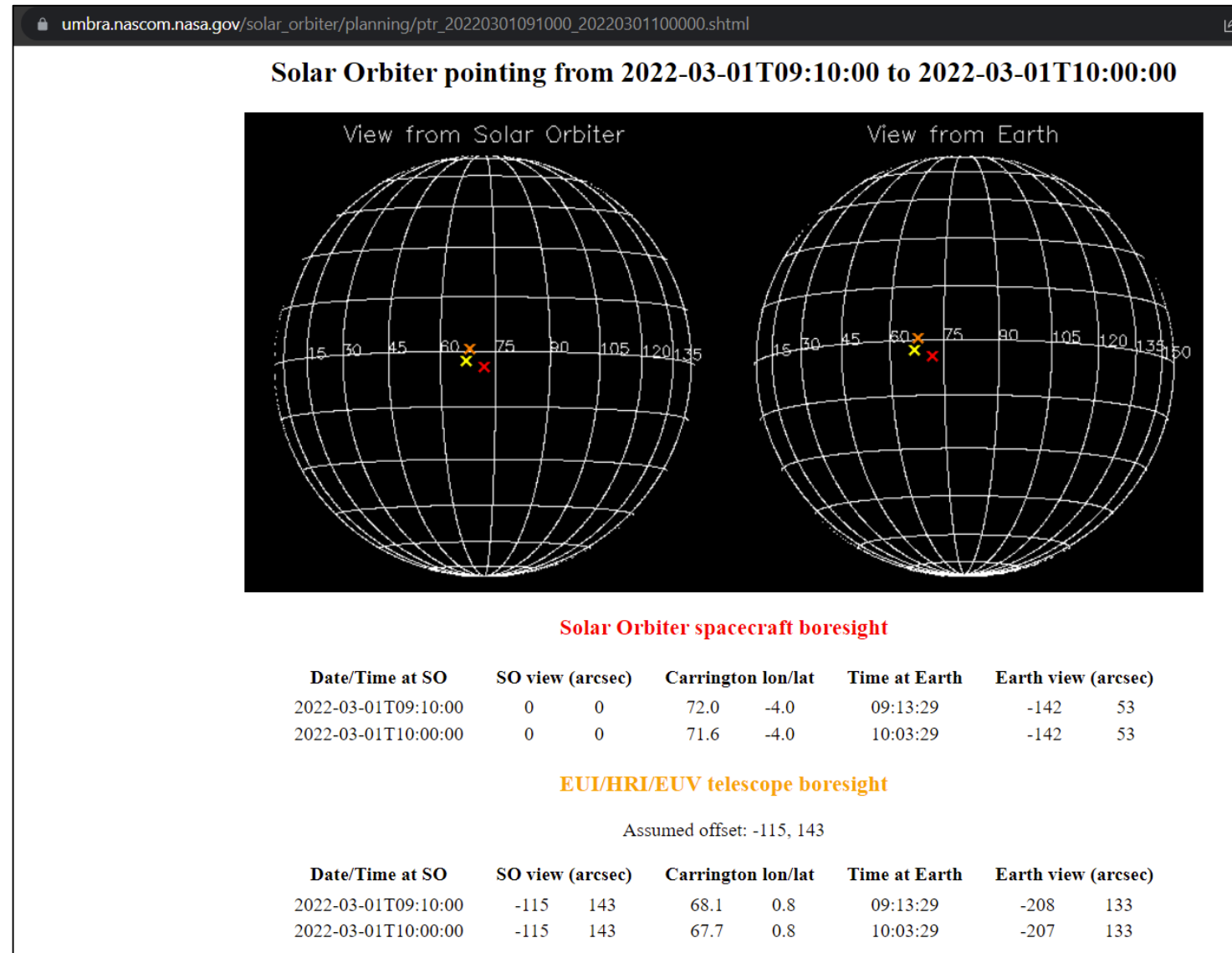
Pointing Coordination for Earth-assets webpage:
https://umbra.nascom.nasa.gov/solar_orbiter/planning/
Info shown here becomes final by observation-time-48hrs.
It is updated shortly after the PDM, linked to the sending of the PTR to MOC

N.B. PDM starttimes have been restricted to the range [10:00, 16:00] local
SOOP coords can request to move meetings where needed for US participants.
Meeting duration assumed as 2 hours

N.B. T4 is NOT accounting for the SOC LL "end-of-pass" delay

LL = Low-Latency Data.
MADAWG= Modelling And Data Analysis Working Group.
MOC = Mission Operations Centre, i.e. ESOC
PDM=Pointing Decision Meeting. Subject of this spreadsheet. Times thereof in shaded column
PTR = Pointing Timeline Request. The operational product created by SOC based on the PDM's decisions
SOC = Science Operations Centre, i.e. ESAC

Meetings to decide the last minute (~3 days in advance) pointing of HRIs and others



EUI-EPD events

STIX - EPD common events list

File Edit View Insert Format Data Tools Extensions Help Last edit was seconds ago

100% \$ % .0 .00 123 Calibri 12 B I S A

AB48		A	T	U	V	W	X	Y	Z	AA	AB	AC
1	Date	EPD					EUI					
2		spectrum	charact.	composition	anisotropy	comments		Data available				comments
3		analyzed						FSI 174	FSI 304	HRI 174	HRI 216	
4	2020-11-17	x	i?		no MAG data	VD, rather diffuse		x				
5	2020-11-17	x	i		no MAG data	good VD		x				
6	2020-11-18		i		no MAG data	VD, low high-energy cutoff		x				
7	2020-11-18	x	i		no MAG data	smaller event, rather diffuse		x				
8	2020-11-18	x	i		no MAG data	good VD		x				
9	2020-11-18	x	i		no MAG data	VD, small event		x				
10	2020-11-19		i		no MAG data	VD, small event, contamination		x	x	x	x	
11	2021-02-13		i		not observed in EPT	VD		x				
12	2021-02-14		i		not observed in EPT	VD		x				
13	2021-02-14		i		not observed in EPT	VD		x				
14	2021-02-15	x	g		small	VD		x				
15	2021-03-05		i		small	VD						
16	2021-04-17		g		small	long-duration wide-spread event						
17	2021-05-07		g		medium	VD, long duration						
18	2021-05-09		?		large, Solo inside MC	VD						

STIX - EPD common events list

File Edit View Insert Format Data Tools Extensions Help Last edit was seconds ago

100% \$ % .0 .00 123 Calibri 12 B I S A

	A	T	U	V	W	X	Y	Z	AA	AB	AC	
1	Date	EPD					EUI					
2		spectrum	charact.	composition	anisotropy	comments	Data available				comments	
3		analyzed					FSI 174	FSI 304	HRI 174	HRI 216		
4	2020-11-17	x	i?		no MAG data	VD, rather diffuse	x					
5	2020-11-17	x	i		no MAG data	good VD	x					
6	2020-11-18		i		no MAG data	VD, low high-energy cutoff	x					
7	2020-11-18	x	i		no MAG data	smaller event, rather diffuse	x					
8	2020-11-18	x	i		no MAG data	good VD	x					
9	2020-11-18	x	i		no MAG data	VD, small event	x					
10	2020-11-19		i		no MAG data	VD, small event, contamination	x	x	x	x		
11	2021-02-13		i		not observed in EPT	VD	x					
12	2021-02-14		i		not observed in EPT	VD	x					
13	2021-02-14		i		not observed in EPT	VD	x					
14	2021-02-15	x	g		small	VD	x					
15	2021-03-05		i		small	VD						
16	2021-04-17		g		small	long-duration wide-spread event						
17	2021-05-07		g		medium	VD, long duration						
18	2021-05-09		?		large, SoLO inside MC	VD						

- EUI data availability done
- Check HRIs pointing
- Comment on the events themselves

- By Marilena Mierla

Eruptions at limb observed by FSI

2022-02-15

FSI304: huge prominence eruption, NE

2022-02-12

FSI304: fast prominence eruption (loop) at W

2022-02-11

FSI304: small filament eruption on disk

2022-02-06

FSI304: nice wave and filament eruption

2022-02-04

FSI304: failed eruption at W

2022-02-03

FSI304: many failed eruptions at W

FSI174: eruptions

2022-02-02

FSI304: prominence at SW, similar with the one from 31.01-01.02

2022-01-31 to 2022-02-01

FSI304: prominence at SW

FSI174: eruption at E

- EUI data available at:
 - https://wwwbis.sidc.be/EUI/data/latest_release_notes.html
 - Or upon request for more recent data
- The connectivity tool can be used for connectivity, also within JHV
- We will work on the EPD / STIX table of events in order to include EUI